

CLAIMS

What I claim is:

1. In an improved surface effect ship wherein said improved surface effect ship includes port and starboard sidehulls and is supported upon a water surface in part by at least one artificially pressurized gas cushion, the improvement comprising:

a port and a starboard bow member wherein water contacting portions of said port and starboard bow members extend, as seen when the improved surface effect ship is moving forward at high speed in a calm sea, forward of an average of longitudinal positions, as seen in longitudinal vertical planes of the improved surface effect ship, of forward water contacting portions of a gas cushion forward seal member by at least five percent of a waterline length of the improved surface effect ship and wherein said gas cushion forward seal member is, at least primarily, of a non-moveable, in relation to the improved surface effect ship, structure and disposed, at least in part, between the port and starboard bow members and wherein inboard sidewalls of said port and starboard sidehulls are at least partially truncated going aft of the port and starboard bow members to thereby reduce wetted area of the improved surface effect ship.
2. The improved surface effect ship of claim 1 wherein the gas cushion forward seal member is angled over a majority of its width as seen in a vertical transverse plane of the improved surface effect ship taken proximal an aft lower end of the gas cushion forward seal member.

3. The improved surface effect ship of claim 1 wherein the gas cushion forward seal member is at least in part of an inverted-V shape as seen in a vertical transverse plane of the improved surface effect ship taken proximal an aft lower end of the gas cushion forward seal member.
4. The improved surface effect ship of claim 1 wherein water contacting portions of said port and starboard bow members extend, as seen when the improved surface effect ship is moving forward at high speed in a calm sea, forward of an average of longitudinal positions, as seen in longitudinal vertical planes of the improved surface effect ship, of water contacting portions of the gas cushion forward seal member by at least ten percent of a waterline length of the improved surface effect ship.
5. The improved surface effect ship of claim 1 wherein water contacting portions of said port and starboard bow members extend, as seen when the improved surface effect ship is moving forward at high speed in a calm sea, forward of an average of longitudinal positions, as seen in longitudinal vertical planes of the improved surface effect ship, of water contacting portions of the gas cushion forward seal member by at least fifteen percent of a waterline length of the improved surface effect ship.
6. The improved surface effect ship of claim 1 wherein water contacting portions of said port and starboard bow members extend, as seen when the improved surface effect ship is moving forward at high speed in a calm sea, forward of an average of longitudinal positions, as seen in longitudinal vertical planes of the improved surface effect ship, of water contacting portions of the gas

cushion forward seal member by at least twenty percent of a waterline length of the improved surface effect ship.

7. The improved surface effect ship of claim 1 wherein water contacting portions of said port and starboard bow members extend, as seen when the improved surface effect ship is moving forward at high speed in a calm sea, forward of an average of longitudinal positions, as seen in longitudinal vertical planes of the improved surface effect ship, of forward water contacting portions of the gas cushion forward seal member by at least twenty-five percent of a waterline length of the improved surface effect ship.
8. The improved surface effect ship of claim 1 wherein forward water contacting portions of said port and starboard bow members further comprise artificially pressurized gas cushion portions disposed in their undersides.
9. The improved surface effect ship of claim 1 wherein the artificially pressurized gas cushion portions disposed in the undersides of the port and starboard bow members extend, as seen when the improved surface effect ship is moving forward at high speed in a calm sea, forward of an average of longitudinal positions, as seen in longitudinal vertical planes of the improved surface effect ship, of forward water contacting portions of the gas cushion forward seal member.
10. The improved surface effect ship of claim 9 wherein the artificially pressurized gas cushion portions disposed in the undersides of the port and starboard bow members extend, as seen when the improved surface effect ship is moving forward at high speed in a calm sea, forward of an average of

longitudinal positions, as seen in longitudinal vertical planes of the improved surface effect ship, of forward water contacting portions of the gas cushion forward seal member by at least five percent of a waterline length of the improved surface effect ship.

11. The improved surface effect ship of claim 9 wherein the artificially pressurized gas cushion portions disposed in the undersides of the port and starboard bow members extend, as seen when the improved surface effect ship is moving forward at high speed in a calm sea, forward of an average of longitudinal positions, as seen in longitudinal vertical planes of the enhanced surface effect ship, of forward water contacting portions of the gas cushion forward seal member by at least ten percent of a waterline length of the improved surface effect ship.
12. The improved surface effect ship of claim 9 wherein the gas cushion portions disposed in the undersides of the port and starboard bow members diverge either side of vertical sidehull longitudinal planes going aft from their forward portions.
13. The improved surface effect ship of claim 12 wherein said vertical longitudinal planes are vertical longitudinal centerline planes of the port and starboard sidehulls.
14. The improved surface effect ship of claim 1 wherein said gas cushion forward seal member disposed between the port and starboard sidehulls extends over less than twenty percent of an overall width of the improved surface effect ship proximal an aft portion of the gas cushion forward seal member.

15. The improved surface effect ship of claim 1 wherein the gas cushion forward seal member is less than twenty percent of a width of the improved surface effect ship as seen in a vertical transverse plane of the improved surface effect ship taken proximal an aft end of the gas cushion forward seal member.
16. The improved surface effect ship of claim 1 wherein said gas cushion forward seal member disposed between the port and starboard bow members extends over less than twenty-five percent of an overall width of the improved surface effect ship proximal said gas cushion forward seal member.
17. The improved surface effect ship of claim 1 wherein said gas cushion forward seal member disposed between the port and starboard bow members extends over less than thirty percent of an overall width of the improved surface effect ship proximal an aft portion of the gas cushion forward seal member.
18. The improved surface effect ship of claim 1 wherein said gas cushion forward seal member disposed between the port and starboard bow members extends over less than thirty-five percent of an overall width of the improved surface effect ship proximal an aft portion of the gas cushion forward seal member.
19. The improved surface effect ship of claim 1 wherein said gas cushion forward seal member disposed between the port and starboard bow members extends over less than forty percent of an overall width of the improved surface effect ship proximal an aft portion of the gas cushion forward seal member.
20. The improved surface effect ship of claim 1 wherein said gas cushion forward seal member disposed between the port and starboard bow members extends

over less than fifty percent of an overall width of the improved surface effect ship proximal an aft portion of the gas cushion forward seal member.

21. The improved surface effect ship of claim 1 wherein the forward gas cushion seal is rigid and connects the port and starboard sidehulls.
22. The improved surface effect ship of claim 1 wherein longitudinally oriented fluid fences extend downward from upper surfaces of the gas cushion recess to thereby restrict fluid flow in the gas cushion.
23. The improved surface effect ship of claim 22 wherein, when the improved surface effect ship is moving forward at high speed in a calm sea, said fluid fences are not in contact with a water surface over a majority of their length.
24. The improved surface effect ship of claim 1 wherein the port and starboard bow members diverge either side of vertical sidehull longitudinal planes going aft from forward portions of their bows.
25. The improved surface effect ship of claim 24 wherein said vertical sidehull longitudinal planes are vertical sidehull centerline planes of the port and starboard sidehulls.
26. The improved surface effect ship of claim 1 wherein a gas cushion aft seal member, as seen in a vertical transverse plane of the improved surface effect ship, comprises at least two inverted-V shaped portions.
27. The improved surface effect ship of claim 1 wherein a gas cushion aft seal member, as seen in a vertical transverse plane of the improved surface effect ship, is angled to horizontal over a majority of its width.

28. The improved surface effect ship of claim 1 wherein pressurized gas is discharged into the gas cushion proximal an aft end of a gas cushion forward seal.
29. The improved surface effect ship of claim 28 wherein pressurized gas is discharged into the gas cushion proximal an aft end of a gas cushion forward seal is made up of more than fifty percent dynamic pressure to thereby form a dynamic gas seal that aids in restricting pressurized gas from escaping from the gas cushion.
30. The improved surface effect ship of claim 28 wherein pressurized gas is discharged into the gas cushion proximal an aft end of a gas cushion forward seal is made up of more than seventy-five percent dynamic pressure to thereby form a dynamic gas seal that aids in restricting pressurized gas from escaping from the gas cushion.
31. The improved surface effect ship of claim 28 wherein pressurized gas is discharged into the gas cushion proximal an aft end of a gas cushion forward seal is made up of more than ninety percent dynamic pressure to thereby form a dynamic gas seal that aids in restricting pressurized gas from escaping from the gas cushion.
32. The improved surface effect ship of claim 28 wherein pressurized gas is discharged into the gas cushion proximal an aft end of a gas cushion forward seal at an average velocity of more than 20,000 feet per minute such that discharge velocity of the pressured gas discharged into the gas cushion is

sufficiently high to form a gas seal thereby restricting pressurized gas from escaping from the gas cushion.

33. The improved surface effect ship of claim 1 wherein there is a third bow member disposed inboard of port and starboard bow members.
34. The improved surface effect ship of claim 1 wherein there is a third bow member and wherein gas cushion forward seal members are disposed between port and starboard bow members and the third bow member.
35. The improved surface effect ship of claim 1 wherein said improved surface effect ship is running at a bow up trim angle of less than five degrees.
36. The improved surface effect ship of claim 1 wherein said improved surface effect ship is running at a bow up trim angle of less than two and one-half degrees.
37. In an improved surface effect ship wherein said improved surface effect ship includes port and starboard sidehulls and is supported upon a water surface in part by at least one artificially pressurized gas cushion, the improvement comprising:

a port and a starboard bow member with a gas cushion forward seal member disposed, at least in its majority, between said port and starboard bow members and wherein said forward seal member is at least in its majority non-moveable in relation to the improved surface effect ship and wherein pressurized gas is discharged rearward into the gas cushion from proximal an aft lower portion of the gas cushion forward seal member to thereby create a pressurized gas seal and wherein said gas cushion forward seal member, as

seen in a vertical transverse plane of the improved surface effect ship located proximal an aft lower portion of the gas cushion forward seal member, is no more than fifty percent of a width of the improved surface effect ship.

38. The improved surface effect ship of claim 37 wherein said gas cushion forward seal member, as seen in a vertical transverse plane of the improved surface effect ship located proximal an aft lower portion of the gas cushion forward seal member, is no more than forty percent of a width of the improved surface effect ship.
39. The improved surface effect ship of claim 37 wherein said gas cushion forward seal member, as seen in a vertical transverse plane of the improved surface effect ship located proximal an aft lower portion of the gas cushion forward seal member, is no more than thirty-five percent of a width of the improved surface effect ship.
40. The improved surface effect ship of claim 37 wherein said gas cushion forward seal member, as seen in a vertical transverse plane of the improved surface effect ship located proximal an aft lower portion of the gas cushion forward seal member, is no more than thirty percent of a width of the improved surface effect ship.
41. The improved surface effect ship of claim 37 wherein said gas cushion forward seal member, as seen in a vertical transverse plane of the improved surface effect ship located proximal an aft lower portion of the gas cushion forward seal member, is no more than twenty-five percent of a width of the improved surface effect ship.

42. The improved surface effect ship of claim 37 wherein said gas cushion forward seal member, as seen in a vertical transverse plane of the improved surface effect ship located proximal an aft lower portion of the gas cushion forward seal member, is no more than twenty percent of a width of the improved surface effect ship.
43. The improved surface effect ship of claim 37 wherein water contacting portions of said port and starboard bow members extend, as seen when the improved surface effect ship is moving forward at high speed in a calm sea, forward of an average of longitudinal positions, as seen in longitudinal vertical planes of the improved surface effect ship, of water contacting portions of the gas cushion forward seal member by at least five percent of a waterline length of the improved surface effect ship.
44. The improved surface effect ship of claim 37 wherein water contacting portions of said port and starboard bow members extend, as seen when the improved surface effect ship is moving forward at high speed in a calm sea, forward of an average of longitudinal positions, as seen in longitudinal vertical planes of the improved surface effect ship, of water contacting portions of the gas cushion forward seal member by at least ten percent of a waterline length of the improved surface effect ship.
45. The improved surface effect ship of claim 37 wherein water contacting portions of said port and starboard bow members extend, as seen when the improved surface effect ship is moving forward at high speed in a calm sea, forward of an average of longitudinal positions, as seen in longitudinal

vertical planes of the improved surface effect ship, of water contacting portions of the gas cushion forward seal member by at least fifteen percent of a waterline length of the improved surface effect ship.

46. The improved surface effect ship of claim 37 wherein water contacting portions of said port and starboard bow members extend, as seen when the improved surface effect ship is moving forward at high speed in a calm sea, forward of an average of longitudinal positions, as seen in longitudinal vertical planes of the improved surface effect ship, of water contacting portions of the gas cushion forward seal member by at least twenty percent of a waterline length of the improved surface effect ship.
47. The improved surface effect ship of claim 37 wherein water contacting portions of said port and starboard bow members extend, as seen when the improved surface effect ship is moving forward at high speed in a calm sea, forward of an average of longitudinal positions, as seen in longitudinal vertical planes of the improved surface effect ship, of water contacting portions of the gas cushion forward seal member by at least twenty-five percent of a waterline length of the improved surface effect ship.
48. The improved surface effect ship of claim 37 wherein forward water contacting portions of said port and starboard bow members further comprise artificially pressurized gas cushion portions disposed in their undersides.
49. The improved surface effect ship of claim 48 wherein the artificially pressurized gas cushion portions disposed in the undersides of the port and starboard bow members extend, as seen when the improved surface effect ship

is moving forward at high speed in a calm sea, forward of an average of longitudinal positions, as seen in longitudinal vertical planes of the improved surface effect ship, of forward water contacting portions of the gas cushion forward seal member by at least five percent of a waterline length of the improved surface effect ship.

50. The improved surface effect ship of claim 48 wherein the artificially pressurized gas cushion portions disposed in the undersides of the port and starboard bow members extend, as seen when the improved surface effect ship is moving forward at high speed in a calm, forward of an average of longitudinal positions, as seen in longitudinal vertical planes of the improved surface effect ship, of forward water contacting portions of the gas cushion forward seal member by at least ten percent of a waterline length of the improved surface effect ship.
51. The improved surface effect ship of claim 48 wherein the gas cushion portions disposed in the undersides of the port and starboard bow members diverge either side of vertical sidehull longitudinal planes going aft from their forward portions.
52. The improved surface effect ship of claim 51 wherein said vertical longitudinal planes are vertical longitudinal centerline planes of the port and starboard sidehulls.
53. The improved surface effect ship of claim 37 wherein inboard portions of the port and starboard sidehulls are at least partially truncated aft of their bow portions.

54. The improved surface effect ship of claim 37 wherein longitudinally oriented fluid fences extend downward from upper surfaces of the gas cushion recess to thereby restrict fluid flow in the gas cushion.
55. The improved surface effect ship of claim 54 wherein, when the improved surface effect ship is moving forward at high speed in a calm sea, said fluid fences are not in contact with a water surface over a majority of their length.
56. The improved surface effect ship of claim 37 wherein a gas cushion aft seal member, as seen in a vertical transverse plane of the improved surface effect ship, comprises at least two inverted-V shaped portions.
57. The improved surface effect ship of claim 37 wherein a gas cushion aft seal member, as seen in a vertical transverse plane of the improved surface effect ship, is angled to horizontal over a majority of its width.
58. The improved surface effect ship of claim 28 wherein pressurized gas is discharged into the gas cushion proximal an aft end of a gas cushion forward seal is made up of more than fifty percent dynamic pressure to thereby form a dynamic gas seal that aids in restricting pressurized gas from escaping forward from the gas cushion.
59. The improved surface effect ship of claim 28 wherein pressurized gas is discharged into the gas cushion proximal an aft end of a gas cushion forward seal is made up of more than seventy-five percent dynamic pressure to thereby form a dynamic gas seal that aids in restricting pressurized gas from escaping from the gas cushion.

60. The improved surface effect ship of claim 28 wherein pressurized gas is discharged into the gas cushion proximal an aft end of a gas cushion forward seal is made up of more than ninety percent dynamic pressure to thereby form a dynamic gas seal that aids in restricting pressurized gas from escaping from the gas cushion.
61. The improved surface effect ship of claim 37 wherein pressurized gas is discharged into the gas cushion proximal an aft end of a gas cushion forward seal at an average velocity of more than 20,000 feet per minute such that discharge velocity of the pressured gas discharged into the gas cushion is sufficiently high to form a gas seal thereby restricting pressurized gas from escaping from the gas cushion.
62. The improved surface effect ship of claim 37 wherein there is a third bow member disposed inboard of port and starboard bow members.
63. The improved surface effect ship of claim 37 wherein there is a third bow member and wherein gas cushion forward seal members are disposed between port and starboard bow members and the third bow member.
64. The improved surface effect ship of claim 37 wherein said improved surface effect ship is running at a bow up trim angle of less than five degrees.
65. The improved surface effect ship of claim 37 wherein said improved surface effect ship is running at a bow up trim angle of less than two and one-half degrees.
66. In an improved surface effect ship wherein said improved surface effect ship includes port and starboard sidehulls and is supported upon a water surface in

part by at least one artificially pressurized gas cushion, the improvement comprising:

a third hull member disposed at least in part between the said port and starboard sidehull bows wherein gas cushion forward seal members are disposed, at least in part, between the port sidehull bow and the third hull member and between the starboard sidehull bow and the third hull member and wherein at least a majority of said forward seal members are non moveable in relation to said improved surface effect ship.

67. The improved surface effect ship of claim 66 wherein pressurized gas is discharged into the gas cushion from proximal aft ends of the gas cushion forward seal members.
68. The improved surface effect ship of claim 28 wherein pressurized gas is discharged into the gas cushion proximal an aft end of a gas cushion forward seal is made up of more than fifty percent dynamic pressure to thereby form a dynamic gas seal that aids in restricting pressurized gas from escaping from the gas cushion.
69. The improved surface effect ship of claim 28 wherein pressurized gas is discharged into the gas cushion proximal an aft end of a gas cushion forward seal is made up of more than seventy-five percent dynamic pressure to thereby form a dynamic gas seal that aids in restricting pressurized gas from escaping from the gas cushion.
70. The improved surface effect ship of claim 28 wherein pressurized gas is discharged into the gas cushion proximal an aft end of a gas cushion forward

seal is made up of more than ninety percent dynamic pressure to thereby form a dynamic gas seal that aids in restricting pressurized gas from escaping forward from the gas cushion.

71. The improved surface effect ship of claim 67 wherein the pressurized gas discharged into the gas cushion from proximal aft ends of the gas cushion forward seal members is discharged into the gas cushion at average velocities of more than 20,000 feet per minute such that discharge velocity of the pressured gas discharged into the gas cushion is sufficiently high to form a gas seal thereby restricting pressurized gas from escaping from the gas cushion.
72. The improved surface effect ship of claim 66 wherein the gas cushion forward seals, as seen in vertical transverse planes of the improved surface effect ship, are angled to horizontal over a majority of their width.
73. The improved surface effect ship of claim 66 wherein inboard portions of the port and starboard sidehulls are at least partially truncated aft of their bow portions.
74. The improved surface effect ship of claim 66 wherein longitudinally oriented fluid fences extend downward from upper surfaces of the gas cushion recess to thereby restrict fluid flow in the gas cushion.
75. The improved surface effect ship of claim 66 wherein forward water contacting portions of said port and starboard bow members further comprise artificially pressurized gas cushion portions disposed in their undersides.
76. In an improved surface effect ship wherein said improved surface effect ship includes port and starboard sidehulls and is supported upon a water surface in

part by at least one artificially pressurized gas cushion, the improvement comprising:

a port and a starboard bow member wherein a gas cushion forward seal member is disposed, at least in its majority, between said port and starboard bow members and wherein pressurized gas discharged into the gas cushion proximal an aft end of the gas cushion forward seal member is made up of more than fifty percent dynamic pressure to thereby form a dynamic gas seal that aids in restricting pressurized gas from escaping from the gas cushion.

77. The improved surface effect ship of claim 76 wherein pressurized gas discharged into the gas cushion proximal an aft end of the gas cushion forward seal member is made up of more than seventy-five percent dynamic pressure to thereby form a dynamic gas seal that aids in restricting pressurized gas from escaping from the gas cushion.

78. The improved surface effect ship of claim 76 wherein pressurized gas discharged into the gas cushion proximal an aft end of the gas cushion forward seal member is made up of more than ninety percent dynamic pressure to thereby form a dynamic gas seal that aids in restricting pressurized gas from escaping from the gas cushion.

79. The improved surface effect ship of claim 76 wherein inboard sidewalls of said improved surface effect ship are, at least in their majority, aft of the gas cushion forward seal member.